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मानक

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IS 12785 (1994, Reaffirmed 2006): Irrigation
Equipment--Strainer-Type Filters--Specification (First
Revision). UDC 631.362 : 621.928.472



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भारतीय मानक

सिंचाई उपस्कर — छन्ना-प्रकार के फिल्टर — विशिष्ट

(पहला पुनरीक्षण)

Indian Standard

IRRIGATION EQUIPMENT — STRAINER-TYPE
FILTERS — SPECIFICATION

(*First Revision*)

UDC 631.362 : 621.928.472

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Price Group 3

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Irrigation Equipment Sectional Committee had been approved by Food and Agriculture Division Council.

In drip irrigation system, the drippers have small narrow passages. Hence there is always the hazard of blocking or clogging by impurities present in the irrigation water. This necessitates the use of filters for an efficient and trouble-free operation of the drippers. The requirement of strainer-type filters intended for operation with drip irrigation systems have been specified in this standard. This standard was first published in 1989 and based on comments received from manufacturers and testing authorities an amendment was issued in October 1992. In this revision some clauses of terminology, sampling and acceptance criteria and test methods are modified in line with ISO/DIS 9912-1.

In the preparation of this standard assistance has been derived from ISO/DIS 9912 'Irrigation equipment — Filters — Part 1 : Strainer-type filters', issued by the International Organization for Standardization (ISO).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

**AMENDMENT NO. 1 MAY 1996
TO
IS 12785 : 1994 IRRIGATION EQUIPMENT —
STRAINER-TYPE FILTERS — SPECIFICATION**

(First Revision)

(Page 1, clause 3.6) — Substitute 'Device' for 'valve' in the title and in the first line of the definition.

(Page 4, clause 7.1) — Add the following at the end:

'g) Maximum flow capacity at declared clean pressure drop'.

(FAD 54)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 2 SEPTEMBER 1998
TO
IS 12785 : 1994 IRRIGATION EQUIPMENT —
STRAINER-TYPE FILTERS — SPECIFICATION
(First Revision)

(*Page 2, clause 5.1, para 3*) — Substitute the following for the existing paragraph:

'If the number of defective specimens in the sample does not exceed the acceptance number specified in Table 1, the sample shall be considered as complying with the requirements of this Indian Standard. If the number of defective specimens in the sample is greater than the acceptance number, the sample shall be considered as not complying with the requirement of this Indian Standard.'

(FAD 54)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO . 3 NOVEMBER 2000
TO
IS 12785 : 1994 IRRIGATION EQUIPMENT —
STRAINER-TYPE FILTERS — SPECIFICATION

(*Page 1, clause 2*) — Insert the following Indian Standards at the appropriate place:

<i>IS No.</i>	<i>Title</i>
554:1985	Dimensions for pipe threads where pressure-tight joints are required on the threads (<i>third revision</i>)
4736:1986	Hot dip zinc coatings on mild steel tubes (<i>first revision</i>)
5116:1996	Domestic and commercial equipment for use with LPG — General requirements (<i>third revision</i>)
6418:1971	Cast iron and malleable cast iron flanges for general engineering purposes
6392:1971	Steel pipe flanges

(*Page 2, clause 4.1.1*) — Insert the following matter at the end:

‘The strainer element shall be either made of stainless steel or plastic or combinations of both. This element should be detachable for cleaning. Housing made of mild steel should be powder coated having a coating thickness between 70 µm to 80 µm or hot dip galvanized.

4.1.1.1 Resistance to abrasion of powder coated surface shall be in accordance with IS 5116.

4.1.1.2 Hot dip galvanizing shall be done in accordance with IS 4736 with a minimum coating of 500 g/m².

(*Page 2, clause 4.3.1*) — Substitute the following for the existing clause:

‘In strainers with threaded ends for direct connection to the supply line, the threads shall comply with IS 2643 or IS 554.’

(*Page 2, clause 4.3.2*) — Substitute the following for the existing clause:

‘Flanged connections shall comply with IS 6418 for cast iron flanges and IS 6392 for mild steel flanges.’

Amend No. 3 to IS 12785 : 1994

(Page 2, clause 4.3.4) — Insert the following new clause after 4.3.4:

‘4.3.5 A gate or ball valve made of gun metal or engineering plastic with minimum opening of 12 mm shall be provided for flushing out the strainer more frequently.’

(FAD 54)

**AMENDMENT NO. 4 MAY 2002
TO
IS 12785 : 1994 IRRIGATION EQUIPMENT —
STRAINER-TYPE FILTERS — SPECIFICATION
(First Revision)**

[Page 2, clause 4.1.1 (see also Amendment No. 3)] — Substitute the following for the existing:

'4.1.1 The strainer parts that are in contact with the water shall be of non-toxic materials, and shall be resistant to or protected against degradation caused by existing working conditions and types of water used in agricultural irrigation. The strainer housing shall also be resistant to environmental conditions. Components belonging to strainers of same size, type and model, and produced by the same manufacturer, shall be interchangeable.

The strainer element shall be either made of stainless steel or plastics or combination of both and should be detachable for cleaning. Housing made of mild steel shall be powder coated or hot dip galvanized. The hot dip galvanizing shall be done in accordance with IS 4736 with a minimum zinc coating of 500 g/m^2 . When measured in accordance with the method given below the thickness of powder coating shall not be less than $70\mu\text{m}$.

4.1.1.1 The powder coating shall be measured at three places preferably on flat portion and avoiding corners with the help of conel gauge having an accuracy not less than one micron. The resulting measurement shall be expressed to the nearest one micron.'

(FAD 54)

Indian Standard

IRRIGATION EQUIPMENT — STRAINER-TYPE FILTERS — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard specifies the general construction requirements and test methods for strainer-type filters (hereinafter called strainers) intended for operation in agricultural irrigation systems.

1.1.1 This standard does not cover filtration ability, efficiency and capacity (quality of filtered water, time of operation before strainer becomes completely clogged, etc), nor does it deal with strainer-type filters that have integral automatic flushing devices.

NOTE — Requirements and methods for testing filtration ability are under study, and will be added later.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

IS No.	Title
2500 (Part 2) : 1965	Sampling inspection tables : Part 2 Inspection by variables for percent defective
2643 : 1975	Dimensions for pipe threads for fastening purposes (<i>first revision</i>)
6418 : 1971	Cast iron and malleable cast iron flanges for general engine- ering purposes

3 TERMINOLOGY

3.0 For the purpose of this standard the following definitions shall apply.

3.1 Strainer-Type Filter (Strainer)

An appliance containing one or more filtering elements, used for separating suspended solids from the water flowing through the appliance and collecting them on the face of the filter element.

3.2 Filter Element

The strainer component, consisting of a perforated plate, screen, mesh, discs, or a combination of these, intended to retain solid contaminants larger than a given size from the water flowing through the component.

3.3 Clogged Filter Element

The filter element which has collected a quantity of solid contaminants, such that it cannot maintain the highest flow rate recommended by the

manufacturer without exceeding the safe maximum pressure drop.

3.4 Strainer Housing

The part of the strainer that contains all the strainer components, except for the control equipment.

3.5 Strainer Housing Cover

A removable cover permitting assembly, disassembly, and cleaning of the strainer elements.

3.6 Drain or Flush Valve

A valve, normally installed at the bottom of the strainer and intended for draining or flushing the strainer housing.

3.7 Nominal Pressure

The maximum static water pressure immediately upstream of the strainer inlet, at which the strainer is required to operate.

3.8 Critical Pressure Drop Before Failure

The maximum allowable pressure difference across each filtering element of the strainer, which will not cause failure of the filter element.

3.9 Safe Maximum Pressure Drop

The maximum allowable difference between inlet and outlet pressures across the strainer when the filter element has become clogged to the extent of requiring cleaning or replacement.

3.10 Clean Pressure Drop

The pressure drop in a clean strainer, measured with a flow of clean water under normal conditions.

3.11 Range of Recommended Flow Rates

The range of flow rates declared by the manufacturer for proper operation of the strainer.

3.12 Nominal Size

A conventional numerical designation, expressed in millimetres, used to indicate the size of the strainer. This designation equals the nominal size of the pipe of which the strainer can be connected without intermediate fittings.

3.13 Aperture Size

The dimension, expressed in microns, of the aperture in the filter element, such as the diameter of a round opening or the side of a square opening.

4 TECHNICAL REQUIREMENTS

4.1 General

4.1.1 The strainer parts that are in contact with the water shall be of non-toxic materials, and shall be resistant to or protected against degradation caused by existing working conditions and types of water used in agricultural irrigation. The strainer housing shall also be resistant to environmental conditions. Components belonging to strainers of the same size, type and model, and produced by the same manufacturer, shall be interchangeable.

4.1.2 Plastics parts of the strainer that are exposed to ultraviolet (UV) radiation in normal working conditions in which the strainer operates shall include additives to improve their resistance to UV radiation. Plastics parts that enclose waterways shall be opaque or shall be provided with an opaque cover design to block all light from reaching clear waterway enclosures.

4.1.3 The construction of the strainer shall be such as to facilitate its proper installation in its intended location and position.

4.1.4 The strainer shall be so designed that after assembly of the filter element in the strainer housing, all the water flowing through the strainer flows through the filter element.

4.2 Strainer Housing

4.2.1 Where the size or thread-connected strainer housing or its configuration does not allow for easy handling of the housing while connecting or disconnecting pipe work, the strainer housing shall be provided with a boss or with the other means of facilitating connection or disconnection of the strainer housing to and from the network.

4.2.2 The strainer shall be so designed that contaminants accumulated on the filter element or in the strainer housing do not enter the supply line when cleaning or replacing the filter element. The construction of the filter element should allow disassembly, cleaning and reassembly of the filter element without removal of the strainer from the supply line.

4.2.3 The strainer housing cover shall be attached to the strainer housing by means of threads or bolts or in any other manner that ensures full and uniform tightness around the cover periphery. Means shall be provided to ensure the tightness of the filter element ends.

4.3 Connections

4.3.1 In strainers with threaded ends for direct connection to the supply line, the threads shall comply with IS 2643 : 1975.

4.3.2 Flanged connections shall comply with IS 6418 : 1971.

4.3.3 For other types of connections, the ends of the strainers shall be designed to match.

4.3.4 A suitable connection shall be provided on the drain outlet to facilitate connection of drainage means from the strainer site.

5 SAMPLING AND ACCEPTANCE CRITERIA

5.1 Type Tests

If the filters are produced as a regular product series, the test specimens shall be taken at random by the test laboratory representative from a quantity of at least 20 strainers. The number of test specimens required for each test shall be as specified in Table 1.

If the filters are not produced as a regular production series and the number of filters produced is less than 20, no requirement is stipulated as to the sampling procedure.

If the number of defective specimens in the sample is equal to or less than the acceptance number specified in Table 1, the lot shall be considered acceptable. If the number of defective specimens in the sample is greater than the acceptance number, the lot shall be rejected.

5.2 Acceptance Test

The test specified in 6.2 is only performed as part of the type tests.

When acceptance of manufacturing lots of strainers is required, the sampling shall be conducted according to IS 2500 (Part 2) : 1965 based on the AQL 2.5 and inspection level IV.

All test specimen in sample, selected at random according to Table 1 of IS 2500 (Part 2) : 1965 shall be tested according to 6.1.

The manufacturing lot complies with this standard if the number of defective specimens found in the test does not exceed the acceptance number specified in IS 2500 (Part 2) : 1965.

For the other tests, except for the test specified in 6.2, the test specimens shall be selected at random in accordance with the number specified in Table 1. The manufacturing lot is considered to comply with this standard if the number of defective specimen found in the other tests does not exceed the acceptance number specified in Table 1.

Table 1 Required Number of Test Specimens and Acceptance Number
(Clauses 5.1 and 5.2)

Clause No.	Name of Test	No. of Test Specimens	Acceptance Number
*6.1	Resistance of strainer to internal hydrostatic pressure	3	1†
6.2	Resistance to internal hydrostatic pressure at high temperature	3	1†
6.3	Resistance of strainer element to buckling or tearing	2	0
6.4	Tightness of strainer element	3	0
6.5	Clean pressure drop	1	0

*For metal strainer housings, *see* 6.1.5; for plastic strainer housings, *see* 6.1.6.
†Refers only to leakage at joints; if there is leakage through the filter housing or damage to the filter element occurs, then the lot shall be rejected.

6 MECHANICAL TESTS

6.0 All tests shall be performed with water at a temperature of 20°C to 30°C, except for test 6.2 where the water temperature shall be 60°C ± 2°C. The instruments used for measuring the various parameters shall permit measurement to an accuracy of within ± 2 percent of the actual values.

6.1 Resistance of Strainer to Internal Hydrostatic Pressure

6.1.1 This test shall be performed on the strainer with all its parts assembled for normal operation.

6.1.2 Before conducting the test on strainers equipped with a drain valve, open and close the valve 100 times while applying a water pressure equal to the nominal operating pressure multiplied 0.75 at the valve inlet.

6.1.3 Close the cover of the strainer housing in accordance with the manufacturer's catalogue.

6.1.4 Close the outlet of the strainer by suitable means. Apply a hydraulic pressure at the inlet of the strainer, and check that no air remains trapped in the system and that the water reaches all places that may be under pressure during the operation of the strainer.

6.1.5 Metal Strainers Housing

Raise the pressure gradually to the declared nominal pressure multiplied by 1.5 and maintain this pressure for one minute.

6.1.5.1 The strainer shall withstand the test pressure without suffering damage or deformation.

6.1.5.2 If the gasket of the housing cover swells or is dislodged, apply the pressure for an additional 15 minutes and recheck for leakages.

6.1.5.3 No signs of leakage shall appear through

the strainer housing, the strainer housing cover seal or the drain valve.

6.1.6 Plastic Strainer Housing

Test methods and requirements for resistance to hydrostatic pressure of the plastics strainer housing are under study and will be added at a later stage. Until these test methods are determined, strainer filters with plastics strainer housing shall be tested according to the procedure described in 6.1.5.

6.2 Resistance to Internal Hydrostatic Pressure at High Temperature

6.2.0 This test shall be performed only for strainer filters with nominal sizes of up to and including 152.4 mm.

6.2.1 Proceed as described in 6.1.1 to 6.1.5, but fill the strainer with water at 60 ± 2°C, while immersing the strainer in a bath in which the water is kept at a constant temperature of 60°C ± 2°C temperature and raise the internal pressure to the nominal pressure. Maintain the pressure and temperature for 15 minutes.

6.2.1.1 The strainer shall withstand the test without showing any signs of leakage.

6.2.2 After completing the test, disassemble the strainer and check the parts for damage.

6.2.2.1 The parts of the strainer shall show no signs of damage or deformation.

6.3 Resistance of Filter Element to Buckling or Tearing

6.3.0 This test is only performed for strainer filter with nominal sizes of up to and including 152.4 mm.

6.3.1 Use a thin film of impermeable plastics, for example polyethylene or PVC to seal the filter elements against the passage of water through it.

In strainers in which the unfiltered water passes normally from the outside to the inside of the filter element, wrap the film around the outside of the filter element. In strainers where the unfiltered water flows normally from the inside to the outside of the filter element, line its inside with the plastics film.

The filter element may be sealed in any other manner, provided that the sealing does not increase or decrease the resistance of the filter element to buckling or tearing. Assemble the sealed filter element in the strainer housing and close the strainer housing cover as described in 6.1.

Keeping the outlet, open, apply a hydraulic pressure at the inlet of the strainer and raise the pressure gradually to the nominal pressure. Maintain this pressure for 5 minutes.

The leakage allowed at the strainer outlet shall not exceed 0.1 percent of the maximum recommended flow rate. This leakage shall remain steady or shall lessen during the test.

6.3.2 Open the cover of the strainer housing in accordance with the manufacturer's instructions.

6.3.2.1 The force or moment required to open the cover shall not exceed the closing force or moment multiplied by 1.5.

6.3.3 Examine the filter element visually.

6.3.3.1 The filter element shall show no signs of permanent deformation, cracks or tears.

NOTE — In strainers containing several filter elements in series, the test shall be performed on each filter element separately.

6.3.4 Test those strainers which, according to the manufacturer's declaration, can be cleaned during operation by means of "full-flow reverse flushing", again as described in 6.3.1 to 6.3.3, but with the following modifications:

- a) In strainers in which the normal water flow is from the outside to the inside of the filter element, line the inside of the filter element with plastics film.
- b) In strainers in which the normal water flow is from the inside to the outside of the filter element, wrap the plastics film around the outside of the filter element.
- c) Keeping the inlet open, apply the hydraulic test pressure at the outlet of the strainer, and raise it to the nominal pressure multiplied by 0.5.

6.4 Tightness of Filter Element

6.4.0 This test is only performed for strainer filter with nominal sizes of up to and including 152.4 mm.

6.4.1 Instead of the regular filter element, install in the strainer a solid impermeable element identical in size to the regular filter element. Close the cover of the housing as described in 6.1. Repeat the test described in 6.3.1.

6.4.1.1 No signs of leakage shall appear at the outlet of the strainer.

NOTES

1 In strainers containing several filter elements, the test is performed on each filter element separately.

2 The test specified in this clause is not performed on strainers in which no leakage has been observed in the test performed according to 6.3.1. Also this test is not performed on strainers whose strainer elements or whose construction does not enable the strainer element to be replaced as required in this clause, or where the water tightness of the strainer elements consisting of plastics screen could affect the test results.

6.5 Clean Pressure Drop

6.5.1 Measure the pressure drop of the clean strainers in the range of flow rates declared by the manufacturer plus 20% beyond each end of the range. Prescreen the water used for the testing pressure loss in clean filter element by passing the water through a filter element with an aperture size of at least 50 percent smaller than the filter elements being tested.

6.5.1.1 The measured pressure drop shall not be more than 10 percent greater than the pressure drop declared by the manufacturer.

7 MARKING

7.0 Each strainer shall bear a readily visible, durable marking incorporating the following particulars.

7.1 Strainer Housing

- a) Name of manufacturer and/or his registered trade-mark;
- b) Model identification;
- c) Nominal size;
- d) Nominal pressure;
- e) Arrow indicating the direction of water flow; and
- f) Size of aperture (if the strainer is supplied with the filter element already assembled). The size of the aperture may be marked on a gummed label attached to the strainer housing in a prominent location. (OPTIONAL MARKING).

7.2 Filter Element

- a) Name of manufacturer and/or his registered trade-mark;

- b) Size of aperture — The size of the aperture may be identified by a marking such as a colour that is defined in the manufacturer's catalogue.

7.3 BIS Certification Marking

The product may also be marked with the Standard Mark.

7.3.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 INFORMATION TO BE SUPPLIED BY THE MANUFACTURER

8.0 The manufacturer shall supply the following informations about the filter strainers.

- a) Name and address of manufacturer or supplier;
- b) Model and catalogue number of strainer;
- c) Strainer data:
 - i) Nominal size,
 - ii) Nominal operating pressure,
 - iii) Range of recommended flow rates,
 - iv) Dimensions of strainer,
 - v) Type of connections to piping network,
 - vi) Length for assembly, and
 - vii) Size of apertures;
- d) Closing instructions;
- e) Instructions for assembly, operation, cleaning, maintenance, including limitations and prohibitions;
- f) List of spare parts;
- g) Resistance to chemicals commonly used in irrigations;
- h) Curve of clean pressure drop in range of recommended flow rates plus 20 percent beyond each end of the range; and
- j) Safe maximum pressure drop.

